a Fourier transform engine coupled to the converter for transforming from a time domain to a frequency domain successive tone sets represented by the digital samples to demodulate the at least one communication channel and vice-versa, and the Fourier transform engine providing a selectable tone spacing for the successive tone sets of the at least one communication channel to alter a bandwidth of the at least one communication channel across the communication medium.

2. (Amended) The communication device of Claim 1, further comprising:

a variable interpolator with an input coupled to the Fourier transform engine and an output coupled to the converter for interpolating the digital samples from the Fourier transform engine by an amount which corresponds inversely with the selected tone spacing to allow the converter to convert the digital samples to the analog signal at a fixed sampling rate for all the selectable tone spacings provided by the Fourier transform engine.

A1 Cont.

3. (Amended) The communication device of Claim 1, further comprising:

a variable decimator with an input coupled to the converter and an output coupled to the Fourier transform engine for decimating the digital samples from the converter by an amount which corresponds inversely with the selected tone spacing to allow the converter to convert the analog signal to digital samples at a fixed sampling rate for all the selectable tone spacings provided by the Fourier transform engine.

4. (Amended) The communication device of Claim 1, wherein the at least one communication medium comprises a plurality of subscriber lines; the at least one communication channel comprises a plurality of communication channels each associated with a corresponding one of the plurality of subscriber lines; and wherein further:

the Fourier transform engine supports modulation and demodulation of each of the plurality of communication channels.

5. (New) The communication device of Claim 1, wherein the Fourier transform engine supports modulation and demodulation of the at least one communication channel in a

A2 Cont.

plurality of multi-tone protocols with a distinct number of tones within each associated tone set and with the Fourier transform engine supporting for at least one of the multi-tone protocols the selectable tone spacing.

6. (New) The communication device of Claim 1, wherein the Fourier transform engine provides the selectable tone spacing by providing a selectable processing interval for transforming the successive tone sets of the at least one communication channel between the time and the frequency domains.

7. (New) The communication device of Claim 1, with the tone spacing for successive tone sets of the at least one communication channel determined by a bandwidth availability on the communication medium.

A2 CoA.

8. (New) The communication device of Claim 1, wherein the at least one communication medium comprises one of a wired and a wireless medium.

9. (New) A logical modem coupling to a communication medium to communicate at least one communication channel thereon via an analog signal with a multi-tone modulation; and the communication device comprising:

an analog front end (AFE) for converting the analog signal from the communication medium to digital samples and vice versa; and

a digital signal processor (DSP) coupled to the AFE for transforming from a time domain to a frequency domain successive tone sets represented by the digital samples to demodulate the at least one communication channel and vice-versa, and DSP providing a selectable tone spacing for the successive tone sets of the at least one communication channel to alter a bandwidth of the at least one communication channel across the communication medium.

10. (New) The logical modem of Claim 9, wherein the AFE further comprises:

at least one digital-to-analog converter (DAC) coupled to the communication medium to convert the digital samples to the analog signal at a fixed sample rate; and

a variable interpolator with an input coupled to the DSP and an output coupled to the DAC for interpolating the digital samples from the DSP by an amount which corresponds inversely with the selected tone spacing to allow the DAC to convert the digital samples to the analog signal at a fixed sampling rate for all the selectable tone spacings provided by the DSP.

11. (New) The logical modem of Claim 9, wherein the AFE further comprises:

at least one analog-to-digital converter (ADC) coupled to the communication medium to convert the analog signal to digital samples at a fixed sample rate; and

a variable decimator with an input coupled to the ADC and an output coupled to the DSP for decimating the digital samples received from the ADC by an amount which corresponds inversely with the selected tone spacing to allow the ADC to convert the analog signal to digital samples at a fixed sampling rate for all the selectable tone spacings provided by the Fourier transform engine.

12. (New) The logical modem of Claim 9, wherein the at least one communication medium comprises a plurality of subscriber lines; the at least one communication channel comprises a plurality of communication channels each associated with a corresponding one of the plurality of subscriber lines; and wherein further:

the DSP supports modulation and demodulation of each of the plurality of communication channels.

13. (New) The logical modem of Claim 9, wherein the DSP supports modulation and demodulation of the at least one communication channel in a plurality of multi-tone protocols with a distinct number of tones within each associated tone set and with the DSP supporting for at least one of the multi-tone protocols the selectable tone spacing.

14. (New) The logical modem of Claim 9, wherein the DSP provides the selectable tone spacing by providing a selectable processing interval for transforming the successive tone sets of the at least one communication channel between the time and the frequency domains.

15. (New) The logical modem of Claim 9, with the tone spacing for successive tone sets of the at least one communication channel determined by a bandwidth availability on the communication medium.

16. (New) The logical modem of Claim 9, wherein the at least one communication medium comprises one of a wired and a wireless medium.

17. (New) A method for communicating at least one communication channel across a communication medium via an analog signal with a multi-tone modulation; and the method comprising:

converting the analog signal from the communication medium to digital samples and vice versa;

transforming from a time domain to a frequency domain successive tone sets represented by the digital samples to demodulate the at least one communication channel and vice-versa; and

selecting a tone spacing for the successive tone sets of the at least one communication channel to alter a bandwidth of the at least one communication channel across the communication medium.

18. (New) The method of Claim 17, further comprising:

variably interpolating the digital samples transformed in the transforming act by an amount which corresponds inversely with the tone spacing selected in the selecting act to allow the converting of the digital samples to the analog signal at a fixed sampling rate.

19. (New) The method of Claim 17, further comprising

variably decimating the digital samples converted in the converting act by an amount which corresponds inversely with the tone spacing selected in the selecting act to allow the converting of the analog signal to digital samples at a fixed sampling rate.

20. (New) The method of Claim 17, wherein the selecting act further comprises the acts